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*Original Article*

# The effect of family-centered care on treatment compliance and therapeutic effect in patients with allergic rhinitis

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**Abstract:** Objective: To investigate the effect of family-centered care (FCC) on the treatment compliance and therapeutic effect in patients with allergic rhinitis (AR). Methods: This study was performed in 86 patients with AR who were admitted to our hospital. According to a random number table, these patients were divided into the control group and the experimental group (43 patients in each group). In the control group, patients received routine nursing care, while patients in the experimental group received both routine nursing care and FCC, where data collection for the understanding of AR disease, psychological intervention, telephone follow-up, and so on were included. The therapeutic effect, treatment compliance, quality of life, adverse emotions, self-efficacy, and adverse reactions in the two groups after intervention were compared. Results: The total effective rate in the experimental group was higher than that in the control group (90.70% vs 76.74%, $P<0.05$). To be specific, the therapeutic effect in 39 patients in the experimental group after 6 months of care was markedly effective or effective, with only 33 patients in the control group. The compliance rate in the experimental group was increased when compared with the control group (93.02% vs 81.40%, $\chi^2=4.403$, $P<0.05$). Compared with the control group, the rhino conjunctivitis quality of life questionnaire scores in all aspects in the experimental group after intervention were decreased (all $P<0.05$). There were no significant differences on self-rating anxiety scale score and self-rating depression scale score between the two groups before intervention (both $P>0.05$). Meanwhile, the self-rating anxiety scale score and self-rating depression scale score in the experimental group after intervention were lower than those in the control group (both $P<0.05$). There were no significant differences concerning exercise of self-care agency (ESCA) scale scores between the two groups before intervention (all $P>0.05$). ESCA scale scores in both groups after intervention were increased. Moreover, ESCA scale scores in the experimental group after intervention were increased when compared with the control group (all $P<0.05$). The incidence of adverse reactions in the experimental group was lower than that in the control group ($P<0.05$). Conclusion: FCC can improve the therapeutic effect of AR patients and increase their compliance to the treatment.

**Keywords:** Family-centered care, allergic rhinitis, compliance, self-efficacy, therapeutic effect

## Introduction

In recent years, with the rapid development of urban industrialization, people's living environments have changed, and environmental allergens have increased. The incidence of allergic rhinitis (AR), which is commonly observed in otorhinolaryngology, is on the rise [1]. The onset of AR is seasonal, and its attack is recurrent. The main clinical symptoms are nasal symptoms, affecting patients' life and work. Literature displays that the incidence of AR is high. It is caused by organ dysfunction, where a wind-chill is prone to occur. Also, it has the characteristics of high difficulty in treatment [2]. Besides the improvement of clinical symptoms, attention needs to be paid to AR patients' mental and social activities to improve their quality of life [3]. The mechanisms of the occurrence and development of AR are still unclear. Therefore, the treatment and care of AR patients has always been an important subject of medical research.

Family centered care (FCC) plays an important role in the rehabilitation of patients, and it has

**Table 1.** Baseline data

| Group | Experimental group (n=43) | Control group (n=43) | $\chi^2$/t | P |
|---|---|---|---|---|
| Gender | | | 0.433 | 0.806 |
| Male | 19 | 16 | | |
| Female | 24 | 27 | | |
| Average age (years) | 41.40±5.20 | 40.80±5.30 | 0.438 | 0.662 |
| Mean course (months) | 13.40±5.20 | 13.22±5.28 | 0.159 | 0.874 |
| Allergens | | | 1.341 | 0.854 |
| Dust mite | 30 (69.77) | 26 (60.47) | | |
| Mold | 8 (18.60) | 10 (23.26) | | |
| Pollen | 12 (27.91) | 15 (34.88) | | |
| Mango | 10 (23.26) | 7 (16.27) | | |
| Soy products | 8 (18.60) | 8 (18.60) | | |
| OSAS | 33 (76.74) | 35 (81.40) | 0.137 | 0.712 |
| Asthma | 15 (34.88) | 13 (30.23) | 0.332 | 0.564 |
| Reflux | 20 (46.51) | 22 (51.16) | 0.221 | 0.638 |
| Diabetes | 18 (41.86) | 17 (39.53) | 0.067 | 0.795 |

Note: OSAS: obstructive sleep apnea hypopnea syndrome.

been used in nursing field worldwide. In this model, the importance of family members and health knowledge, and family participation in maintaining the patients' health, are emphasized. FCC is of great help to improve the therapeutic effect and increase the enthusiasm for the treatment [4, 5]. However, the current literature on FCC is mainly taken from the mothers and infants, and there are few studies on the therapeutic effect of FCC in patients with AR. In this study, we employed FCC in the treatment of AR patients, who were admitted to Gongren Hospital of Wuzhou City from October 2018 to October 2019, to explore its effect on treatment compliance and therapeutic effect.

## Materials and methods

### *General information*

In total, 86 AR patients who were admitted to Gongren Hospital of Wuzhou City from October 2018 to October 2019 were recruited in this study. According to a random number table, these patients were assigned to the control group (n=43) and the experimental group (n=43). In the experimental group, 25 patients had 2 kinds of allergens, while there were 23 patients in the control group with 2 allergens. Patients in both groups had no history of surgery. This study was approved by the Ethics Committee of Gongren Hospital of Wuzhou City. Informed consent was signed by the patients or their family members. Baseline data is shown in **Table 1**.

### *Inclusion and exclusion criteria*

Inclusion criteria: Patients met the diagnostic criteria of the Guidelines for Diagnosis and Treatment of AR, which was formulated by the Otolaryngology Department of Chinese Medical Association [6]; the course of the disease was more than 180 d; patients had clear consciousness and normal cognition; patients could cooperate during the clinical treatment process; patients volunteered to participate in the study.

Exclusion criteria: Patients had pulmonary dysfunction or other bronchial diseases; patient with poor language ability or cognitive impairment; patients who failed to participate in the study due to subjective or objective reasons.

### *Methods*

Routine nursing care was carried out for patients in the control group. To be specific, the care was composed of the following measures: guidance on the medication of anti-allergic drugs; self-care methods; distribution of AR care manuals to patients; notifying patients to reduce their exposure to allergens; and drugs were administrated based on medical advice.

In the experimental group, patients received both routine nursing care and FCC. Specifically, FCC consisted of 7 measures. (1) Before nursing, nursing staff collected and analyzed patients' information on social environment, family history of AR, and so on. In this way, they were aware of patients' psychological needs, contributing to the establishment of mutual trust between nursing staff and patients. (2) A patient database was established to benefit the return visits after discharge. (3) Health education: Family members were informed of knowledge on AR disease before discharging. After leaving the hospital, they were guided to disinfect and ventilate the living environment. In addition, guidance on the medication was

**Table 2.** Grading of therapeutic effect

| Therapeutic effect | Runny nose and stuffy nose |
|---|---|
| Markedly effective | Clinical symptoms were improved more than 66% |
| Effective | Clinical symptoms were improved between 26% and 65% |
| Ineffective | Clinical symptoms were improved less than 25% |

supplied. As a result, patients were able to master methods on self-care and problem-solving. (4) AR education was given for family members. They were instructed to have a supportive attitude and realize the importance of a good family environment for the treatment and recovery of patients. They were aware of allergens and were responsible for the reduction of patients' contact with allergens in daily life. Specifically, patients allergic to dust mites should dry their bedding frequently; patients allergic to pollen should be away from flowers breeding; if economic conditions permit, air purifiers should be installed to create a suitable working and living environment. (5) Telephone follow-up: The importance of medication was emphasized within 30 days. What's more, patients were informed of knowledge on medication and instructed to complete self-management. (6) Psychological intervention: The importance of family support was emphasized. AR patients with recurrent symptoms were prone to adverse emotions. Supervising and understanding them from family members was very important for the stabilization of patients' mentality. To reduce the incidence of adverse emotions, patients were taken care of. For patients with adverse emotions, nursing staff were talked with them to know the symptoms. Psychological interventions (like language intervention) were also performed. (7) Recheck and follow-up: Patients were rechecked once every 90 days. Intervention was conducted in accordance with the changes in patients' condition. The time of intervention lasted for 6 months.

*Outcome measures*

*Main outcome measures:* Therapeutic effect: After 6 months of care, the therapeutic effect of the care in both groups was assessed according to the Principles and Recommendations for the Diagnosis and Treatment of AR [7]. The therapeutic effect was divided into 3 levels (**Table 2**). The total effective rate = (Markedly effective + effective)/the total number of patients * 100%.

Compliance: after 6 months of care, the Morisky Medication Adherence Scale was applied to evaluate the medication, cooperation in treatment, and so on. Based on compliance to the medical advice, the evaluation was divided into 3 grades: complete compliance (100%), partial compliance (over 80%), and poor compliance (below 80%). The compliance rate = complete compliance rate + partial compliance rate.

Rhinoconjunctivitis Quality of Life Questionnaire (RQLQ) score: After 6 months of care, RQLQ, which was composed of 7 aspects and 28 items, which was used to evaluate the quality of life. Specifically, the 7 aspects consisted of activity restriction, nasal symptoms, and so on. The lower the score was, the better the quality of life.

Adverse emotions: Self-rating depression scale (SDS) and self-rating anxiety scale (SAS) were used to evaluate adverse emotions before and 6 months after care [8, 9]. Both scales were composed of 20 items. The higher the score was, the more serious the adverse emotions.

*Secondary outcome measures:* Self-efficacy: Before and 6 months after care, exercise of self-care agency (ESCA) scale was applied to evaluate self-efficacy. Aspects like self-care skills and self-care concept were assessed. The higher the score was, the better the self-efficacy.

Adverse reactions: During the care period, adverse reactions (fever, itchy eyes, and dry throat) were observed and recorded. The incidence of adverse reactions was thus calculated.

*Statistical methods*

The data were analyzed using SPSS statistical software version 23.0. Therapeutic effect, compliance, and adverse reactions were expressed as number/percentage (n/%); comparison was conducted with chi-square test. RQLQ scores, adverse emotions, and ESCA scores were calculated as mean ± standard deviation (x ± sd); independent sample t test was used for intergroup comparison. The difference was statisti-

**Table 3.** Therapeutic effect (n, %)

| Group | Markedly effective | Effective | Ineffective | Total effective rate |
|---|---|---|---|---|
| Experimental group (n=43) | 28 (65.12) | 11 (25.58) | 4 (9.30) | 39 (90.70) |
| Control group (n=43) | 23 (53.49) | 10 (23.26) | 10 (23.26) | 33 (76.74) |
| $\chi^2$ | | 3.109 | | 4.413 |
| P | | 0.211 | | 0.025 |

**Table 4.** Compliance (n, %)

| Group | Complete compliance | Partial compliance | Poor compliance | Compliance rate (%) |
|---|---|---|---|---|
| Experimental group (n=43) | 29 (67.44) | 11 (25.58) | 3 (6.98) | 40 (93.02) |
| Control group (n=43) | 22 (51.16) | 13 (30.23) | 8 (18.60) | 35 (81.40) |
| $\chi^2$ | | 3.400 | | 4.403 |
| P | | 0.183 | | 0.032 |

cally significant when *P* value was less than 0.05.

## Results

*Therapeutic effect*

After 6 months of care, the therapeutic effect in 39 patients in the experimental group was markedly effective or effective, while it was the same for 33 patients in the control group. This displayed that the total effective rate in the experimental group was higher than that in the control group (90.70% vs 76.74%, $\chi^2$=4.413, P=0.025, **Table 3**).

*Compliance*

The compliance in the experimental group was increased when compared with the control group (93.02% vs 81.40%, $\chi^2$=4.403, P=0.032, **Table 4** and **Figure 1**).

*RQLQ scores*

As shown in **Table 5**, RQLQ scores in all aspects in the experimental group after intervention were lower than those in the control group (all P<0.05).

*SAS and SDS score*

As displayed in **Table 6** and **Figure 2**, there were no significant differences on SAS and SDS score between the two groups before intervention (both P>0.05); SAS and SDS score in the experimental group after intervention were lower than those in the control group (both P< 0.01).

*ESCA scale scores*

As shown in **Table 7**, there were no significant difference concerning ESCA scale scores between the two groups before intervention (all P>0.05); ESCA scale scores in both groups after intervention were increased; ESCA scale scores in the experimental group after intervention were higher than those in the control group (all P<0.01).

*Adverse reactions*

During the care period, the incidence of adverse reactions (fever, eye itching, and dry throat) in the experimental group was lower than that in the control group (11.63% vs 23.26%, P<0.05, **Table 8**).

## Discussion

AR is an inflammation of the nasal mucosa induced by immune mediators, which is observed when impairment of respiratory system is developed under the stimulation of external substances. Big data analysis displays that there are hundreds of millions of AR patients in the world, and the incidence of AR in half of Chinese cities is over 10%. There is no doubt that AR has become a social health problem [10]. The clinical symptoms of patients with AR are not fatal. However, patients suffer from a lot of pressure. Adverse conditions are then developed, affecting their social function and prognosis [11]. Therefore, the treatment and daily care of patients with AR are critical.

Patients with AR need long-term medication to improve clinical symptoms like nasal itching and paroxysmal sneezing. They suffer from great physical and mental stress, and their confidence in the treatment is generally low, resulting in poor clinical treatment efficacy [12]. The novel concept in FCC is in line with the all-round development of society, science, and people, enabling the establishment of a mutually beneficial relationship between medical staff and family members. Accordingly, the concept of health care is jointly conveyed to patients, and self-confidence in the treatment is increased,

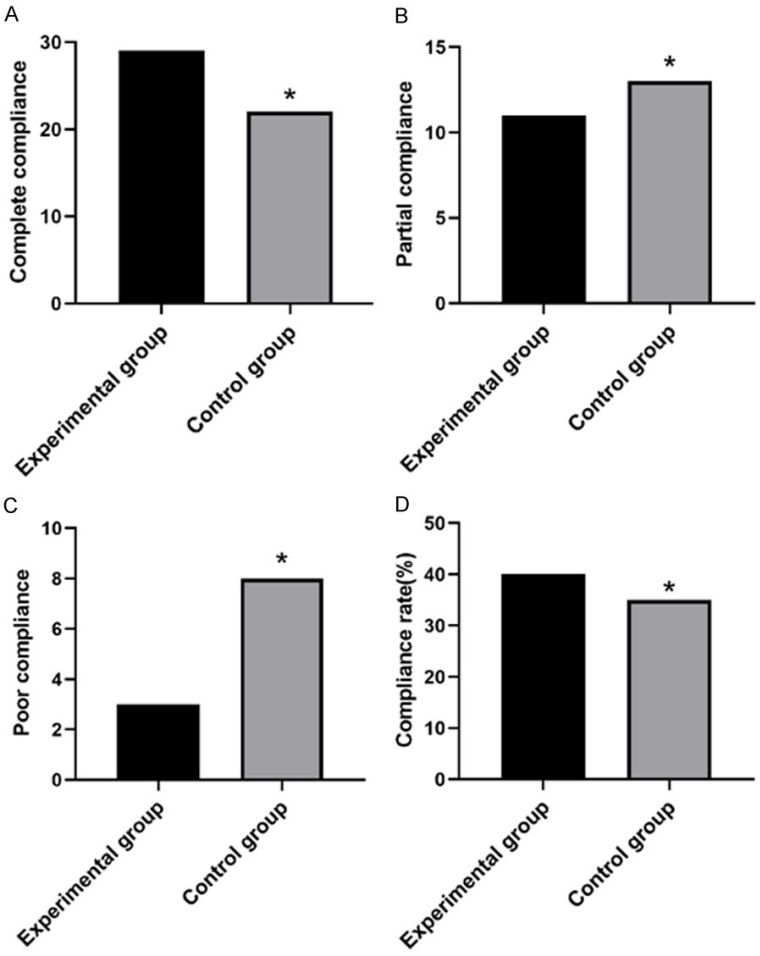


**Figure 1.** Comparison of compliance. A. Complete compliance; B. Partial compliance; C. Poor compliance; D. Compliance rate (%). Compared with control group, *P<0.05.

**Table 5.** RQLQ scores

| Group | Experimental group (n=43) | Control group (n=43) | t | P |
|---|---|---|---|---|
| Physiological function | 76.12±5.85 | 89.39±6.89 | 8.041 | <0.001 |
| Physical pain | 75.70±6.07 | 86.30±7.32 | 6.106 | <0.001 |
| Energy | 74.29±7.13 | 83.07±8.13 | 4.447 | 0.003 |
| Social function | 71.25±5.44 | 80.47±7.62 | 5.378 | 0.002 |
| Emotional title | 78.29±6.52 | 83.34±6.03 | 3.098 | 0.027 |
| Mental Health | 73.69±5.83 | 84.77±7.41 | 7.656 | <0.001 |
| General health | 72.23±7.69 | 84.05±7.19 | 7.151 | <0.001 |
| In total | 76.92±5.69 | 87.23±6.59 | 7.486 | <0.001 |

Note: RQLQ: rhinoconjunctivitis quality of life questionnaire.

improving the effectiveness of clinical efficacy. In FCC, patients' social and psychological information are collected, and targeted nursing measures are taken. Explanation of health knowledge, which is beneficial for the improvement of clinical efficacy, is included in FCC. Thompson-Brazill et al. reported that the application of FCC in patients who underwent cardiac surgery could decrease the length of hospitalization, speed up recovery, and improve therapeutic effect [13]. In this study, we found that therapeutic effect in the experimental group was better than that in the control group.

Compliance is a direct feedback of patients' obedience and acceptance of medical staff, and an indirect reflection of the relationship between patients and medical staff. The level of compliance is positively related to clinical treatment and recovery process. The onset of AR needs to be relieved by long-term medication. It is carried out in accordance with the medical advice to improve clinical symptoms [14]. The importance of family members in FCC is emphasized. In this model, family members' understanding of AR disease is strengthened, and they are exhorted to improve the medication compliance of AR patients. FCC can increase self-confidence and improve treatment compliance. In addition, special psychology is understood and knowledge on AR is taught, meeting the social and psychological needs of patients [15]. Here, treatment compliance in the experimental group was higher than that in the control group. This indicates that FCC can improve the treatment compliance of patients with AR, improving the condition.

Physical and mental health is reflected in the quality of life. AR patients have excessive worry about disease, leading to poor mental and physical status. A series of complications such as anxiety, depression, and insomnia are then

**Table 6.** SAS and SDS score

| Group | SAS score | | SDS score | |
|---|---|---|---|---|
| | Before intervention | After intervention | Before intervention | After intervention |
| Experimental group (n=43) | 42.37±5.33 | 22.38±4.39### | 46.59±4.32 | 24.50±3.28### |
| Control group (n=43) | 43.09±5.10 | 33.29±5.44# | 45.33±5.10 | 35.67±4.12# |
| t | 0.640 | 10.230 | 1.236 | 13.910 |
| P | 0.524 | 0.005 | 0.219 | 0.003 |

Note: Compared with before intervention, #P<0.05, ###P<0.001. SAS: self-rating anxiety scale; SDS: self-rating depression scale.

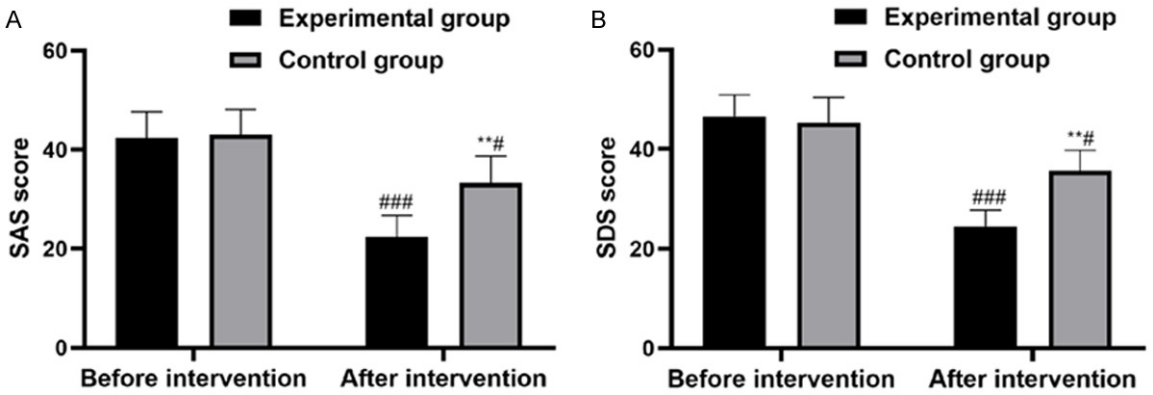


**Figure 2.** Comparison of SAS and SDS score before and after invention. A. SAS score; B. SDS score. Compared with before intervention, #P<0.05, ###P<0.001; compared with control group, **P<0.01. SAS: self-rating anxiety scale; SDS: self-rating depression scale.

**Table 7.** ESCA scale scores

| Aspects | Time | Experimental group | Control group | t | P |
|---|---|---|---|---|---|
| Self-care skill | Before intervention | 17.50±2.33 | 18.03±2.09 | 1.110 | 0.270 |
| | After intervention | 28.45±3.02 | 23.45±2.59** | 8.241 | <0.001 |
| Self-care concept | Before intervention | 19.44±2.66 | 20.09±2.34 | 1.203 | 0.232 |
| | After intervention | 29.40±3.36 | 24.42±3.89** | 6.353 | <0.001 |
| Self-care responsibility | Before intervention | 16.79±2.12 | 17.03±1.90 | 0.540 | 0.591 |
| | After intervention | 29.80±2.81 | 22.05±2.55** | 13.390 | <0.001 |
| Self-care knowledge | Before intervention | 38.97±3.60 | 39.20±3.45 | 0.303 | 0.760 |
| | After intervention | 52.38±3.66 | 46.77±3.39** | 7.374 | <0.001 |

Note: Compared with control group, **P<0.01. ESCA: exercise of self-care agency scale.

**Table 8.** Adverse reactions (n, %)

| Group | Fever | Itchy eyes | Dry throat | The incidence of adverse reactions |
|---|---|---|---|---|
| Experimental group (n=43) | 2 (4.65) | 1 (2.33) | 2 (4.65) | 5 (11.63) |
| Control group (n=43) | 5 (11.63) | 3 (6.98) | 2 (4.65) | 10 (23.26) |
| $\chi^2$ | 1.192 | 0.956 | | 4.745 |
| P | 0.275 | 0.328 | | 0.029 |

developed [16]. SAS and SDS scale are applied to evaluate patients' emotions. Depression, weight loss, and declined sleep quality are the main aspects of the scales. The levels of anxiety and depression are increased with the prolongation of the disease. In severe cases, the thought of suicide may occur. In FCC, the relationship between patients and their family members are improved, which is

beneficial for an increase in quality of life and reduction of adverse emotions [17]. In this study, the quality of life in the experimental group was improved when compared with the control group, while adverse emotions were declined. These results denote that FCC contributes to the improvement of patients' living conditions, increasing the enthusiasm in treatment.

Self-efficacy, a core concept, refers to the production of belief and self-potential after dealing with certain difficulties. Patients with AR have self-doubt and low self-efficacy [18, 19]. In FCC, patients and their family members are instructed on the basis of routine nursing care. Self-efficacy is significantly improved after performing follow-up, guiding family members with correct care, and consolidating knowledge on care [20, 21]. Li et al. reported that FCC could increase patients' compliance to medication, improve therapeutic effect, and reduce adverse reactions [22]. In our study, self-efficacy in the experimental group was improved when compared with the control group, while adverse reactions were declined. These results suggest that FCC is highly beneficial for the improvement of self-potency, increase of confidence in the treatment, and reduction of adverse reactions. This was consistent with the conclusion made by Panek et al. [23].

There are some shortcomings in this study. Firstly, RQLQ scores in the two groups before intervention are not assessed, failing to compare the changes in quality of life before and after intervention. Secondly, only 86 AR patients admitted within one year were enrolled in this study. In other words, the sample size is small, which may have an impact on the results. Consequently, experimental data and sample sizes will be expanded in further research to provide strong clinical evidence for clinical care.

In summary, FCC can improve therapeutic effect and increase treatment compliance.

## Disclosure of conflict of interest

None.

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